SCP SCIENCE

Providing Innovative Solutions to Analytical Chemists

Analysis Report

1.0 DESCRIPTION: Matrix Reference Material *Enviro***MAT Contaminated Soil** (SS-1)
Catalogue Number: 140-025-001
Lot Number: SC0063618
Expiration Date: 2 years from date of shipment (See Ship Date label on bottle)

2.0 CONSENSUS VALUES (See section 8 for additional details):

Parameter	Consensus Value (mg/kg)	Uncertainty (+/-)	Confidence Interval (mg/kg)	Tolerance Interval (mg/kg)
Ag	0.88	0.03	0.85 – 0.91	0.72 – 1.04
Al	12 163	410	11 753 – 12 572	9 579 – 14 746
As	20.7	1.0	19.7 – 21.8	14.0 – 27.5
B	26.9	8.4	18.5 – 35.2	0.0 – 77.8
Ba	464	16	448 – 480	359 – 569
Be	0.48	0.05	0.43 – 0.53	0.22 – 0.74
Ca	50 265	1213	49 052 – 51 478	42 222 – 53 308
Cd	3.2	0.2	3.0 – 3.5	1.8 – 4.7
Ce	(40.1)	----	----	----
Co	12.9	0.4	12.5 – 13.4	10.2 – 15.7
Cr	103	5	97.9 – 109	66.6 – 140
Cu	403	10	393 – 413	334 – 472
Fe	72 000	2273	69 728 – 74 273	57 212 – 86 789
Hg	0.41	0.02	0.39 – 0.43	0.29 – 0.53
K	2232	150	2082 – 2382	1257 – 3208
Li	14.3	1.4	12.9 – 15.8	6.4 – 22.3
Mg	9690	230	9459 – 9920	8141 – 11 239
Mn	737	19	718 – 756	605 – 869
Mo	6.8	0.3	6.5 – 7.2	4.7 – 9.0
Na	650	64	587 – 714	235 – 1066
Ni	59.2	1.3	57.9 – 60.5	50.4 – 68.0
P	1552	34	1518 – 1586	1329 – 1775
Pb	764	15	749 – 779	665 – 863
S	1916	140	1776 – 2057	1045 – 2787
Sb	5.5	1.1	4.4 – 6.6	0.0 – 12.0
Se	0.78	0.14	0.64 – 0.92	0.02 – 1.54
Sn	340	17	324 – 357	245 – 436
Sr	114	1	113 - 116	106 – 122
Ti	530	57	473 – 587	195 – 865
Tl	(0.19)	----	----	----
U	0.78	0.03	0.74 – 0.81	0.61 – 0.94
V	27.2	1.4	25.9 – 28.6	18.8 – 35.7
Zn	1114	37	1078 – 1151	860 – 1369

3.0 APPROVAL AND REVISION:
Approval: Daniel Boisvert, Chemist
Date of Issue of Report: May 3rd, 2010

4.0 DESCRIPTION AND INTENDED USE:

The Matrix Reference Material SS-1 is a Type B naturally contaminated soil (not spiked or fortified) with a particle size of -200 mesh. It is designed to be used for quality control verification or methods development for the analysis of soil by ICP, ICP/MS, GFAA or AA Spectroscopy techniques for the listed parameters. Not intended for calibration.

5.0 INSTRUCTIONS FOR USE AND STABILITY:

Instructions for use: The material must be dried at 105°C for two hours before use. Before weighing, mix the material by shaking the container to avoid segregation in the bottle. In order to have a representative sample, the minimum use quantity must be 250 mg to conform to previous homogeneity testing. Results are to be calculated on a dry weight basis.
Stability: This MRM is guaranteed to be stable up to 2 years from the shipping date provided the material is kept sealed, stored under normal laboratory conditions and used according to good laboratory practices. Shipping date will be stamped on container at time of shipping. **SCP SCIENCE** will monitor the stability of representative samples regularly and if any changes occur that invalidate the reported results, **SCP SCIENCE** will notify purchasers.

Date of last verification: **December 11, 2018**

6.0 HAZARDOUS INFORMATION:

Please refer to the associated Safety Data Sheet (SDS) for information regarding this product (available at http://www.scpscience.com/ecert).

7.0 PREPARATION METHOD AND HOMOGENEITY:

Preparation Method: The initial sample has been dried, crushed and sieved through a 0.5 inch sieve. The “fines” portion has been further crushed and sieved with 80% of the material passing through a 200 mesh screen. This portion has been re-pulverized and sieved through a 200 mesh sieve to obtain 100% less than 200 mesh. The final material has then been packaged in 100 g containers and tested for homogeneity.
Homogeneity: The homogeneity of the material has undergone third party verification by Particle Size Analysis and by Acid digestion (Extractable metals) using ICP-AES for analysis. The method used for material homogeneity determination is based on ISO Guide 35.

8.0 ANALYSIS AND DETERMINATION OF CONSENSUS VALUES:

These values were the result of an inter-laboratory study involving twenty-seven laboratories. Each laboratory was asked to supply analysis data for a specific list of elements employing a method based on EPA-3050B Acid Digestion (HNO_3/HCl). Not all the laboratories supplied data for the different parameters. Consensus Values are based on an average of 14 values per parameter (20 values being the highest and 9 values being the lowest). Values in brackets are not certified as less than 9 values were received. They are provided for information only.

The outliers were removed using the Dixon Test after confirmation that there was neither a connection between outliers and the methods used for analysis nor between the outliers and the nature of the sample.

The Confidence Interval has been calculated using the 95% Confidence Level (equivalent to 2σ) using the following formula:

$x \pm ts/\sqrt{n}$ where

- n: number of data
- s: Standard Deviation of the Average
- t: factor for Student Test
- x: Reference Value

The Confidence Interval should be used for routine quality control.

The Tolerance Interval has been calculated using again a 95% probability with a 95% inclusion of the population. The following formula was used:

$x \pm ks$ where k: factor for two-sided Tolerance Limits
s: Standard Deviation of the Average
x: Reference Value

The Tolerance Interval is an indication of the lowest possible value and the highest possible value based on the complete set of data, exclusive of outliers, used to calculate the Consensus Value.

The following table is a guideline on how to interpret the results:

Results within Confidence Interval	Method working properly
Results outside Confidence Interval but within Tolerance Interval	Method may need improvement
Results outside Tolerance Interval	Method not working properly

9.0 REFERENCES:

ISO Guide 30: Terms and definitions used in connection with reference materials
ISO Guide 31: Reference materials – Contents of certificates, labels and accompanying documentation
ISO Guide 35: Certification of reference materials--General and statistical principles
Standard Reference Materials-Handbook for SRM Users - John K. Taylor
Quality Assurance of Chemical Measurements - John K. Taylor
EPA 3050B - Acid Digestion of Sediments, Sludges and Soils (Revision 2, 1996)

10.0 QUALITY SYSTEM CERTIFICATIONS:

ISO 9001 Certification: This reference material was produced in a facility which operates under a **registered** ISO 9001 Quality Management System. Please consult our web site for a copy of the most recent revision of our certificate of registration.

ISO 17025 Accreditation: SCP SCIENCE (Corporate Headquarters) operates an ISO 17025:2005 **accredited** laboratory. Please consult our web site for a copy of the most recent revision of our certificate and scope of accreditation.

ISO 17034 Accreditation: SCP SCIENCE (Corporate Headquarters) is an ISO 17034 accredited Reference Material Producer. Please consult our website for a copy of our most recent certificate and scope of accreditation**.**

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